

**WHAT IS CLAIMED IS:**

1. An apparatus for retreading tires, comprising:
  - a tire casing mount configured to have a tire casing mounted thereto;
  - a cushion gum applicator configured to stretch a length of cushion gum onto the tire casing;
  - a tread dispenser configured to automatically dispense a length of tire tread based on the circumference of at least one of the tire casing and the tire casing plus the cushion gum; and
  - a tread applicator configured to stretch the length of tire tread onto the cushion gum,wherein the cushion gum applicator, the tread dispenser, and the tread applicator are integrated into a single machine.
2. The apparatus of claim 1, further comprising:
  - a measuring device configured to measure at least one of the circumference of the tire casing and the cushion gum.
3. The apparatus of claim 1, wherein the tread dispenser comprises:
  - a tread cutter, configured to cut the tread to a determined length.
4. The apparatus of claim 1, wherein the tread dispenser comprises:
  - a curved track for guiding the length of tire tread.
5. The apparatus of claim 1, wherein the tread dispenser comprises:
  - a first clamp for clamping the length of tire tread adjacent a first end; and



5 the first tangential velocity minus the second tangential velocity provide a  
6 nonnegative differential velocity.

1 12. The apparatus of claim 11, wherein the differential  
2 velocity is substantially constant during application of the cushion gum.

1 13. An apparatus for retreading tires, comprising:  
2 a hub for mounting a tire casing;  
3 a cushion gum applicator configured to stretch a  
4 length of cushion gum onto the tire casing;  
5 a tread dispenser configured to automatically dispense  
6 a length of tire tread based on the circumference of at least one of the tire  
7 casing and the tire casing plus the cushion gum, the length of tire tread  
8 having a first end and a second end and a periodically repeating tread  
9 pattern;  
10 a tread cutter configured to cut the tread to a  
11 determined length; and  
12 a tread applicator configured to apply the length of tire  
13 tread onto the cushion gum.

1 14. The apparatus of claim 13, wherein the determined  
2 length is specified by an operator.

1 15. The apparatus of claim 13, wherein the determined  
2 length is based on matching the pattern at the first end with the pattern  
3 at the second end of the tire tread.

1 16. The apparatus of claim 13, wherein the determined  
2 length may be automatically specified.

1 17. The apparatus of claim 16, wherein the tread cutter is  
2 configured to automatically cut the tread to the determined length.

1 18. The apparatus of claim 13, wherein the tread  
2 applicator monitors the length of tire tread that has been applied to the  
3 cushion gum and the length of tire tread that has yet to be applied.

1 19. The apparatus of claim 13, wherein the tread  
2 applicator is configured to stretch the tire tread onto the cushion gum.

1 20. The apparatus of claim 13, wherein the tread  
2 applicator is configured to stretch the tire tread onto the cushion gum, the  
3 stretch being controlled such that the gap, between the first end and the  
4 second end when the tire tread has been applied to the cushion gum, is  
5 within a predetermined range of distances.

1 21. The apparatus of claim 13, wherein the tread  
2 applicator includes an applicator roller.

1 22. The apparatus of claim 21, wherein the applicator  
2 roller is configured to apply the tread to the cushion gum with a variably  
3 controlled force.

1 *Sub* 23. A method of retreading tires, comprising:  
2 *037* mounting a tire casing on a hub, the hub being  
3 rotatable;  
4 stretching a length of cushion gum around the  
5 circumference of the tire casing, the stretch being controlled during  
6 application;  
7 measuring the circumference of the tire casing with  
8 the cushion gum applied;  
9 dispensing, automatically, a length of tire tread based  
10 on the circumference of the tire casing with the cushion gum applied; and  
11 applying the length of tire tread to the cushion gum,

12 wherein the stretching, measuring, dispensing, and  
13 applying are performed on an integrated machine.

1 ~~24. The method of claim 23, further comprising:~~  
2 ~~measuring the circumference of the tire casing.~~

1 ~~25. The method of claim 24, further comprising:~~  
2 ~~rotating the hub at an angular rate based on the~~  
3 ~~circumference of the tire casing.~~

1 ~~26. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to an automatically determined~~  
3 ~~length.~~

1 ~~27. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to an operator determined length.~~

1 ~~28. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to a length based on the tire~~  
3 ~~tread design.~~

1 ~~29. The method of claim 23, wherein applying the length~~  
2 ~~of tire tread includes controlling an application pressure.~~